

PATENT SPECIFICATION

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724,588

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COMPLETE SPECIFICATION

A process for manufacturing Divided Wound Cores for
Transformers and similar apparatus

We, ALLMANNA SVENSKA ELEKTRISKA
Aktiebolaget, a Swedish Company, of
Västera, Sweden, do hereby declare the
invention, for which we pray that a Patent
5 may be granted to us, and the method by
which it is to be performed, to be particu-
larly described in and by the following
statement:—

Our co-pending application No. 25058/51
10 (Serial No. 696,346) relates to a process for
manufacturing a divided wound magnetic
core for a transformer or similar apparatus
which comprises the steps of leading a ribbon
15 of magnetic material through a punching
tool, punching slits across part of the width
of the ribbon at those places where the wound
core is intended to be divided while main-
taining the two marginal zones of the ribbon
20 unpunched, winding the ribbon on to a wind-
ing mandrel, holding the layers of the wound
core together by binding means and cutting
through the unpunched marginal zones by
grinding, sawing, milling or the like.

In order to obtain the desired inclination
25 of the cut surfaces with respect to the core
walls, the operating device for the punching
tool is provided with a compensation means.
In this manner the cut surfaces of the core
30 halves receive the shape of a more or less
inclined smooth plane. The advantage of this
process is that the major part of the work
of dividing the core is performed by a simple
punching tool without losing the possibility
35 of winding the ribbon into a core. The con-
tact surfaces of the individual adjacent layers
are exactly uniform, so that the magnetic
losses are reduced to a minimum. The forma-
tion of burrs which may occur when con-
40 ventionally wound cores are severed is com-
pletely avoided thanks to this process.

The present invention relates to a process
and apparatus for further improving the trans-
ition of the magnetic flux in the butt joints
between the core halves. It is known that an

overlap of the sheets in the butt joints im-
proves the transition of the magnetic flux
from one sheet to the other and this inven-
tion relates to a process by which an over-
lap of the ribbons of the core halves may
be obtained.

According to the invention the slits across
the inner part of the width of the ribbon are
punched at spaced intervals at each half rev-
olution of the winding mandrel in such a
manner that the slits on the wound core are
50 displaced with respect to one another at every
layer or at a plurality of layers, so that over-
laps are formed by at least two layers.

In Application No. 25058/51 (Serial No.
696,346) a continuous compensation for the
control of the alignment of the slits is per-
formed during the punching operation.

According to the present invention, the
compensation is effected discontinuously but in
such a manner that the sum of the com-
pensation is equal to the sum of compensa-
tions of the corresponding continuous com-
pensation.

The invention will now be described with
reference to the accompanying drawing, to
which

Figure 1 shows a ribbon 1 with a slit 2,
Figures 2a and 2b show a wound core,
viewed from two sides.

Figure 3 shows a ribbon with a slit 2
in one layer thereof and a slit 2' in the
immediately underlying layer of the ribbon.

Figure 4 is a section through a part of
a wound core, wherein the overlap is formed
by two ribbon layers, and

Figure 5 shows schematically a punching
and winding arrangement substantially similar
to the arrangement described in Appli-
cation No. 25058/51 (Serial No. 696,346),
but comprising in addition a device by which
the punching tool is caused to perform a reci-
procating movement lengthwise of the ribbon.
The amplitude of the reciprocating movement

[Prior 2d. &d.]

is equal to the length of the overlap. This compensation is suitably controlled by the winding mandrel.

As is apparent in Figure 5, the ribbon 1 is drawn from a storage reel, carried past a punching tool 9 (indicated by dotted lines), and wound on to a mandrel 4. It is the purpose of the invention to bring about a continuous movement of the punching tool 5 for the compensation of the distance between the punching tool and the winding mandrel, as well as a reciprocating movement for obtaining the overlaps. For this purpose the punching tool support, according to the embodiment exemplified in Figure 5, is divided into two parts 5 and 6. The part 5 is displaced continuously to the right during rotation of the winding mandrel by means of a nut 7 threaded on to a screw 8 which is joined with the shaft to the winding mandrel 4. The part 5 carries along with it the part 6, which latter supports the punching tool 9. The part 6 in its turn is controlled by a device joined with the part 5 by means of which the part 6 is caused to perform a reciprocating movement on the part 5, in dependence on the rotation of the winding mandrel, the part 5 serving as a slide. This device may for instance consist of a toothed gear transmission 10 and a guiding cylinder 11 provided with a helical slot 12 and coupled with the transmission. A follower 13 engages in the slot 12 and is joined with the part 6 of the punching tool support. Rotation of the guiding cylinder 11 causes the part 6, together with the punching tool 9 contained therein, to be moved to and fro as indicated by the arrows. The punching tool 9 receives its impulses for the punching operation by means of a toothed gear transmission 14 and a shaft 15 with a cam 16. The punching tool 9 itself must be capable of movement with the ribbon when it is in engagement therewith. This may be effected by mounting the punching tool in the manner shown diagrammatically in Figure 3a of Application No. 25058/51 (Serial No. 696,346).

The ribbon, after being wound on to a core, may be heat-treated as usual, and if

necessary be impregnated thereafter. The marginal zones 2¹¹, Figure 3, on both sides of the slits 2 are removed by grinding, sawing, or milling, so that the core is divided into two parts. These are provided with the electric winding, assembled and held together in any known manner.

What we claim is:—

1. A process for manufacturing a divided wound magnetic core for a transformer or similar apparatus comprising the steps of leading a ribbon of magnetic material past a punching tool, punching slits across the inner part of the width of the ribbon, leaving marginal zones unpunched, at spaced intervals along the ribbon, one slit upon each half revolution of a winding mandrel, on to which the punched ribbon is wound, in such a manner that adjacent slits or groups of slits on the wound core are displaced with respect to one another, so that overlaps are formed by at least two layers, and dividing the wound core by removing therefrom the marginal zones adjacent to said slits.

2. Apparatus for manufacturing a divided wound magnetic core by the process claimed in claim 1, comprising a storage reel from which the ribbon of magnetic material is drawn by the mandrel, said punching tool being arranged to punch said slits in the ribbon during its passage from the storage reel to the mandrel, said mandrel being coupled with operating means for the punching tool, which operating means is adapted to cause a continuous displacement as well as a reciprocating movement of the punching tool both in the longitudinal direction of the ribbon, and means for dividing the wound core.

3. Apparatus for manufacturing a divided wound magnetic core by the process claimed in claim 1, constructed and arranged substantially as herein described and as shown in the accompanying drawing.

4. Divided wound magnetic cores produced by the process claimed in claim 1.

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724,588 COMPLETE SPECIFICATION

1 SHEET

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